

**THE 37TH ANNUAL SYMPOSIUM
OF THE
AMERICAN VACUUM SOCIETY
NEW MEXICO CHAPTER**

THE SCIENCE OF MICROFABRICATION

Wednesday, May 23, 2001

Session Chairs: James Maxwell
Los Alamos National Laboratory
James Fleming
Sandia National Laboratories

Invited Speakers

RANDY GILES
Lucent Technologies

JOSEF HORMES
Louisiana State University/CAMD

- 8:30 ***Invited Lecture:*** Micromachines in Optical Networks, R. GILES (Lucent Technologies)
- 9:10 Waveguiding in 3-D, Silicon Photonic Lattices, J.G. FLEMING and S.-Yu Lin (Sandia National Laboratories)
- 9:30 Mechanical Properties of Surface Micromachined MEMS Materials, T.E. BUCHHEIT, S.J. Glass, T.A. Friedmann and S.S. Mani (Sandia National Laboratories)
- 9:50 Stability of Alkylsilane Monolayer Films in Humid Environments, T.M. MAYER, H.I. Kim, M.G. Hankins and M.P. de Boer (Sandia National Laboratories)
- 10:10 Break
- 10:30 ***Invited Lecture:*** Microfabrication at CAMD using Synchrotron Radiation, J. HORMES (Center for Advanced Microstructures and Devices, Louisiana State University)
- 11:10 Laser-induced Exothermic Growth of High Aspect Ratio Microstructures from the Vapor Phase, J.L. MAXWELL¹ and M. Boman² (¹Los Alamos National Laboratory, ²Uppsala University)
- 11:30 Laser-Based Direct Writing of Electronic Components, B.H. KING (Optomec, Inc.)

THIN FILM STRUCTURE AND MECHANICAL PROPERTIES

Wednesday, May 23, 2001

Session Chair: Jerry Floro
Sandia National Laboratories

Invited Speakers

WILLIAM NIX
Stanford University

ERIC CHASON
Brown University

- 1:10 **Invited Lecture:** Mechanisms of Stress Development in Thin Metal Films during Deposition, W.D. NIX (Stanford University)
- 1:50 Strengthening Mechanisms in Metallic Multilayered Films, A. MISRA, H. Kung, J.P. Hirth and R.G. Hoagland (Los Alamos National Laboratory)
- 2:10 The Nucleation of Dislocations and Subsequent Interactions with Faceted Interfaces in Au Thin Films, G. LUCADAMO and D.L. Medlin (Sandia National Laboratories, Livermore, CA)
- 2:30 Deformation and Stability of Nanoscale Metallic Multilayers, H. KUNG, A. Misra, R.G. Hoagland, D. Embury and J.P. Hirth (Los Alamos National Laboratory)
- 2:50 Break
- 3:10 **Invited Lecture:** Stress Relaxation Kinetics during Strained Layer Heteroepitaxy, E. CHASON, C. Lynch, K. Tetz, R. Beresford, E. Chen, D. Paine and L.B. Freund (Brown University)
- 3:50 Control and Elimination of Cracking of AlGa_N Thin Films using Low-Temperature AlGa_N Interlayers, K.E. WALDRIP¹, J. Han¹, J.A. Floro¹, S.R. Lee¹, D.M. Folltaedt¹, S.J. Hearne¹, J.J. Figiel¹, A.A. Allerman¹, G.A. Petersen¹, S.M. Myers¹, B.P. Gila², C.R. Abernathy² (¹Sandia National Laboratories, ²University of Florida)
- 4:10 Linking Stress to Surface Structure, G. THAYER^{1,2}, N. Bartelt², V. Ozolins², A. Schmid², S. Chiang¹, R. Hwang² (¹University of California at Davis, ²Sandia National Laboratories, Livermore, CA)
- 4:30 Bulk Vacancies and Surfaces under Non-equilibrium Conditions, T.R. MATTSSON (Sandia National Laboratories)

THIN FILMS: ELECTRONIC PROPERTIES AND DEVICES

Thursday, May 24, 2001



Session Chair: Jerry Floro
Sandia National Laboratories

Invited Speaker

PAUL HOLLOWAY

University of Florida, Distinguished AVS Lecturer

- 8:30 **Invited Lecture:** Ni/Au Ohmic Contacts to p-GaN Epilayers, B. Liu¹, P. HOLLOWAY¹ and W.B. Alexander² (¹University of Florida, ²Uniroyal Optoelectronics)
- 9:10 Interaction of Hydrogen with Magnesium and Point Defects in Wurtzite GaN, A.F. WRIGHT and S.M. Myers (Sandia National Laboratories)
- 9:30 Correlation between Local Atomic Strain and Charge Transport in Si-rich Silicon Nitride Thin Films, S. HABERMEHL and C. Carmignani (Sandia National Laboratories)
- 9:50 Absorption and Raman Scattering Spectroscopies from Semiconductor-Glass Composites, T.J. BUKOWSKI, T.M. Neidt, R. Ochoa and J.H. Simmons (Sandia National Laboratories)
- 10:10 Break
- 10:30 Thin Film Dispenser Cathodes for Micro-Thermionic Emission Devices, K.R. ZAVADIL, D.B. King and J.A. Ruffner (Sandia National Laboratories)
- 10:50 Effect of Texture on the Electrical Properties of $\text{La}_{0.5}\text{Sr}_{0.5}\text{CoO}_3$ Thin Films, L.A. EMMERT, B-Ho Park, J.R. Groves, R.F. DePaula, L. Stan, Q.X. Jia and P.N. Arendt (Los Alamos National Laboratory)
- 11:10 Waveguide Design and Fabrication, R.W. SPRINGER and J. Maxwell (Los Alamos National Laboratory)
- 11:30 Codeposition of the DEB-Palladium Hydrogen Getter System, D.W. CARROLL, D.R. Pesiri, K.V. Salazar, M. Trkula, J.A. Rau and C.W. Sandoval (Los Alamos National Laboratory)

NANOMETER-SCALE MATERIALS PROCESSING AND PROPERTIES

Thursday, May 24, 2001

Session Chairs: Neal Shinn
Terry Michalske
Sandia National Laboratories

Invited Speakers

JAMES HEATH
University of California-Los Angeles
KEVIN MALLOY
University of New Mexico
RACHEL GOLDMAN
University of Michigan

- 1:00 **Invited Lecture:** Self-assembled Semiconductor Nanostructures: Diffusion, Segregation, and Three-Dimensional Quantum Dot Crystals, R.S. GOLDMAN (University of Michigan)
- 1:40 Suppression of Phase Separation in $(\text{AlAs})_{2\text{ML}}(\text{InAs})_{2\text{ML}}$ Superlattices using $\text{Al}_{0.48}\text{In}_{0.52}\text{As}$ Monolayer Insertions, S.R. LEE, J.L. Reno, and D.M. Follstaedt (Sandia National Laboratories)
- 2:00 **Invited Lecture** The Optoelectronic Properties of Strain-Induced Morphologies and Microstructures in Heteroepitaxial Semiconductors, K.J. MALLOY, A. Stintz, X. Huang, A. Ushakov, D. Popescu and L. Lester (University of New Mexico)
- 2:40 Fabrication of Nanostructures with Interferometric Lithography, D. BURCKEL, S.Zhang, A.Raub and S.R.J.Brueck (University of New Mexico)
- 3:00 Break
- 3:20 Biotechnology at the Molecular Scale: The Use of Biological Motors as Actuators in Nano-Electro-Mechanical Systems, G.D. BACHAND¹ and C.D. Montemagno² (¹Sandia National Laboratories, ²Cornell University)
- 3:40 **Invited Lecture** Molecular Electronics Architectures, Devices, and Circuits, J. HEATH (University of California-Los Angeles)
- 4:20 Hydration Forces on Protein-Resistant Surfaces, H.I. KIM, J.G. Kushmerick, J.E. Houston, P.D. Hampton and B.C. Bunker (Sandia National Laboratories)